

## REMARKS

In the Office Action, the Examiner rejected claims 1 and 7 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,463,618 (hereinafter, "*Furukawa*") in view of allegedly Admitted Prior Art ("APA"); rejected claims 2 and 8 under 35 U.S.C. § 103(a) as being unpatentable over *Furukawa* in view of APA and further in view of U.S. Patent No. 5,475,791 (hereinafter "*Schalk*"); rejected claims 3 and 9 under 35 U.S.C. § 103(a) as being unpatentable over *Furukawa*, APA, *Schalk* and further in view of "Continuous Speech Recognition in Noise Using Spectral Subtraction and HMM Adaptation," 1994 (hereinafter, "*Flores*"); rejected claims 4, 5, 10, and 11 under 35 U.S.C. § 103(a) as being unpatentable over *Furukawa*, APA, *Schalk* and further in view of "Signal Conditioning Techniques for Robust Speech Recognition," 1996 (hereinafter, "*Rahim*"), *Flores*, and allegedly well known prior art; and rejected claims 6 and 12 under 35 U.S.C. § 103(a) as being unpatentable over *Rahim* and allegedly well known prior art.

By this Amendment, Applicants propose to amend independent claims 1 and 7 to clarify the claim language and to place these claims in better form for appeal by including the subject matter previously recited in claims 3 and 9. In addition, Applicants propose to amend claims 4, 5, 10 and 11 to maintain consistency with the changes to claims 1 and 7, and cancel claims 3, 6, 9 and 12 without prejudice or disclaimer of the recited subject matter. Furthermore, Applicants propose to add new claims 13 and 14 to clarify further aspects of the Applicants' invention. Support new claims 13 and 14 may be found in the specification at, for example, pages 23:23-24:6, 36:12-39:19, and FIGs. 12-16.

After entry of this Amendment, claims 1, 2, 4, 5, 7, 8, 10, 11, 13 and 14 will be pending. Applicants request the Examiner's reconsideration and allowance of the pending claims in light of the remarks that follow.

Rejection of Independent claims 1 and 7 under 35 U.S.C. § 103(a)

The applied references cannot support a *prima facie* case of obviousness for the rejection of proposed claim 1 under 35 U.S.C. § 103(a) because there is no proper suggestion to combine the references as asserted by the Examiner. To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

As noted above, proposed claim 1 is amended to include the recitations of claim 3. To the extent the Examiner's rejection of claim 3 under 35 U.S.C. § 103(a) applies to proposed claim 1, the Examiner admits that *Furukawa*, APA, and *Schalk* fail to disclose "determining a spectrum mean and subtracting the spectrum mean from the spectrum." (Office Action, pp. 4:30-5:2.) To overcome the admitted deficiencies of *Furukawa*, APA, and *Schalk*, the Examiner relies on *Flores* for teaching a continuous spectral subtraction (CSS) scheme that allegedly "receives noisy speech, performs a Fourier transform, determines a spectrum average and subtracts the spectrum average from the spectrum." Based on this, the Examiner concludes it would have been obvious to one of ordinary skill

in the art at the time of the invention to modify *Furukawa*, the APA and *Shalk* to arrive at the invention recited in claim 1. Applicants respectfully disagree.

Nowhere does *Flores* or the other applied references disclose or suggest a combination including, at least, “subtracting said pseudo acoustic echo signal from a near-end speech signal to remove an acoustic echo component and thereby generate an acoustic signal which has been echo-canceled for each sample” and “determining a spectrum for each frame by performing the Fourier transform on said acoustic echo-canceled signal” (emphasis added), as recited in proposed claim 1.

The Examiner has previously argued that *Flores* suggests modifying the combination of *Furukawa*, the APA and *Schalk* because the *Flores* “indicates that improvements are obtained by adding the explicit signal enhancement (spectral subtraction).” (See Office Action mailed December 31, 2002, page 10, lines 2-3). However, this motivation neither suggests the above-noted features of claim 1, nor does it provide a convincing explanation as to why an artisan would modify the *Flores*’ CSS scheme for “determining a spectrum for each frame by performing the Fourier transform on said acoustic echo-canceled signal,” let alone combine the CSS scheme with a system for “subtracting said pseudo acoustic echo signal from a near-end speech signal to remove an acoustic echo component and thereby generate an acoustic signal which has been echo-canceled for each sample” (emphasis added), as recited in proposed claim 1. Indeed, since *Flores* fails to disclose the recited “frames” and “echo-cancelled signal,” *Flores* provides no suggestion to modify *Furukawa*, the APA or *Schalk* to arrive at the above-noted features of claim 1. Instead, Applicants respectfully submit that the Examiner’s motivation for combining the references is based on the Applicants’ own disclosure. (See, e.g., FIG. 12 and Specification, pp. 36:12-39:19.)

Such reliance, however, amounts to improper hindsight reconstruction and cannot properly support a rejection under 35 U.S.C. § 103(a). Applicants therefore respectfully request that the Examiner reconsider and withdraw the rejection of claim 1 under 35 § U.S.C. § 103(a) and allow the claim.

Claim 7, although of different scope than claim 1, recites similar features to those of claim 1. Accordingly, for at least the reasons discussed above with regard to claim 1, *Furukawa* and the APA, taken alone or in combination, cannot support a *prima facie* case of obviousness for claim 7. Applicants therefore request that the Examiner reconsider and withdraw the rejection of claim 7 under 35 § U.S.C. § 103(a) and allow the claim.

Rejection of claims 2 and 8 under 35 U.S.C. § 103(a)

Claims 2 and 8 depend from independent claims 1 and 7, respectively, and thus include all the recitations of their respective independent claims. Accordingly, claims 2 and 8 are allowable for at least the reasons provided for proposed claims 1 and 7. Applicants therefore request that the Examiner reconsider and withdraw the rejection of claims 2 and 8 under 35 § U.S.C. § 103(a) and allow these claims.

Rejection of claims 3 and 9 under 35 U.S.C. § 103(a)

By this Amendment, Applicants propose to cancel claims 3 and 9. Accordingly, the rejection of claims 3 and 9 under 35 § U.S.C. § 103(a) is moot.

Rejection to Claims 4-5 and 10-11 under 35 U.S.C. § 103(a)

Applicants respectfully traverse the rejection of claims 4, 5, 10, and 11 under 35 U.S.C. § 103(a) as being unpatentable over *Furukawa*, APA, *Schalk* and further in view of *Rahim*, *Flores*, and allegedly well known prior art.

As noted above, *Furukawa*, *APA*, *Schalk*, and *Flores*, either taken alone or in combination, do not disclose or suggest the above-noted features of claim 1, from which claims 4 and 5 indirectly depend. *Rahim*, *O'Shaughnessy* and *Parsons* also fail to disclose "means for determining a spectrum for each frame by performing the Fourier transform on said acoustic echo-canceled signal; means for successively determining a spectrum mean for each frame based on the spectrum obtained; and means for successively subtracting the spectrum mean from the spectrum calculated for each frame from said acoustic echo-canceled signal to remove additive noise of an unknown source," as recited in proposed claim 1. Further, the Examiner does not rely on these references for such teachings. Applicants therefore request that the Examiner reconsider and withdraw the rejection of claims 4, 5, 10 and 11 under 35 U.S.C. § 103(a) and allow these claims, as well.

Rejection to Claims 6 and 12 under 35 U.S.C. § 103(a)

By this Amendment, Applicants propose to cancel claims 6 and 12. Accordingly, the Examiner's rejection of claims 6 and 12 is moot.

Proposed New Claims 13 and 14.

Proposed new claim 13 recites, "applying a normalized least mean square error algorithm, controlled by a near-end talk detection algorithm based on a frame by frame basis voice activity detection algorithm, to an input signal to create an acoustic echo-cancelled signal; and applying a continuous spectral substitution algorithm to each frame of said acoustic echo-cancelled signal to remove unknown noise sources from said acoustic echo-cancelled signal." Applicants respectfully submit that the applied prior art fails to teach or suggest the recitations of claim 13 at least because the applied references do not

disclose or suggest applying a continuous spectral substitution algorithm to each frame of said acoustic echo-cancelled signal to remove unknown noise sources from said acoustic echo-cancelled signal," as recited in claim 13. Accordingly, Applicants respectfully request entry and allowance of claim 13.

Proposed new claim 14, although of different scope, includes recitations similar to those of claim 13. Accordingly, Applicants also request entry and allowance of claim 14.

Conclusion


In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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